

PATENT COOPERATION TREATY

From the Japan Patent Office (INTERNATIONAL SEARCHING AUTHORITY)

PCT

To:

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(Implementing Regulation 40 bis)
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) 19.07.2005

Applicant's or agent's file reference

517-0091

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2005/006609

International filing date (day/month/year)

04.04.2005

Priority date (day/month/year)

19.04.2004

International Patent Classification (IPC) Int.Cl.⁷ H03H9/64, 9/145

Applicant (Name)

Murata Manufacturing Co., Ltd.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220

3. For further details, see notes to Form PCT/ISA/220

Date of completion of this opinion

05. 07. 2005

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purpose of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	3, 6	YES
	Claims	1-2, 4-5, 7	NO
Inventive step (IS)	Claims	6	YES
	Claims	1-5, 7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO

2. Citations and explanations:

Claims 1, 2, and 5

Cited Reference 1: JP 2003-092527 A (Matsushita Electric Industrial Co., Ltd.)

2003.03.28, [0033] to [0062], Fig. 1, Fig. 3

& US 2003/0030511 A1

Disclose a surface acoustic wave filter of a cascade-connected longitudinal mode type in which the electrode fingers of cascade-connected IDTs are set at a pitch that is smaller than the pitch of the electrode fingers of IDTs that are not cascade-connected.

Accordingly, Claims 1, 2, and 5 lack novelty and inventive steps in view of Cited Reference 1.

Cited Reference 2: JP 2000-091881 A (Toyo Communication Equipment Co., Ltd.)

2000.03.31, Claim 5, [0007] to [0014], Fig. 3

Discloses a double-mode filter including three IDTs in which the electrode fingers of the two outer IDTs are arranged at a pitch that is smaller than the pitch of the electrode fingers of the IDT in the middle.

Cited Reference 3: JP 2002-084165 A (Murata Manufacturing Co., Ltd.)

2002.03.22, full text, Fig. 1, Fig. 10

& US 2001/0043024 A1

Disclose longitudinally-coupled-resonator-type surface-acoustic-wave filters that are connected in a cascade fashion.

As disclosed in, for example, Cited Reference 3, cascade-connecting longitudinally-coupled-resonator-type elastic-wave filters is a known art. Accordingly, applying the known art to the surface acoustic wave filter of Cited Reference 2 to attain the elastic-wave filter according to Claims 1, 2, and 5 is obvious to those skilled in the art.

Consequently, Claims 1, 2, and 5 lack inventive steps in view of Cited Reference 2 and Cited Reference 3.

It is a common technical knowledge in the field of elastic-wave filters that the reduction of the pitch of the electrode fingers of IDTs leads to higher frequency of the conductance peak. For this reason, in the surface acoustic wave filter according to Cited Reference 1 and the surface acoustic wave filter attained by applying the known art to Cited Reference 2, it is obvious that the frequency of the conductance peak in the cascade-connected IDTs is higher than the frequency of the conductance peak in the IDTs that are not cascade-connected.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported the description, are made:

(1) It is written in Paragraph [0023] of the specification that an object of the subject application is "to reduce an adverse effect of a parasitic capacitance in cascade-connected wires between the longitudinally-coupled-resonator-type elastic-wave filter elements so as to improve impedance matching of a cascade-connected portion and to improve the VSWR characteristics of input-output terminals of the elastic-wave filter".

On the other hand, it is written in Paragraphs [0032] to [0033] of the specification that "a relative dielectric constant of the piezoelectric substrate is preferably set at 30 or more. In a piezoelectric substrate whose relative dielectric constant is 30 or more, the parasitic capacitance is increased, thereby achieving an outstanding improvement in the VSWR characteristic."

Regardless of the fact that the object of the subject application is to reduce the adverse effect of the parasitic capacitance in order to improve the VSWR characteristics of the input-output terminals of the elastic-wave filter, it is not clear why a piezoelectric substrate that increases the parasitic capacitance is preferably used.

Accordingly, Claim 3 and Claims 5 to 7 are not sufficiently supported in the specification.

(2) It is written in Paragraph [0033] of the specification that "in a piezoelectric substrate whose relative dielectric constant is 30 or more, the parasitic capacitance is increased, thereby achieving an outstanding improvement in the VSWR characteristic."

However, the cause-and effect relationship between the increase in the parasitic capacitance in the cascade-connected wires and the improvement in the VSWR characteristics of the input-output terminals of the elastic-wave filter is unclear.

Accordingly, Claim 3 and Claims 5 to 7 are not sufficiently supported in the specification.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: No. V.2

Claim 3

Cited Reference 4: JP 2003-258603 A (Murata Manufacturing Co., Ltd.)
2003.09.12, [0050]
& US 2003/0117239 A1

Disclose that a relative dielectric constant of LiTaO_3 is approximately 43.

Applying LiTaO_3 according to Cited Reference 4 to the surface acoustic wave filter according to Cited Reference 1 so as to attain the elastic-wave filter according to Claim 3 is obvious to those skilled in the art.

Furthermore, applying LiTaO_3 according to Cited Reference 4 and the known art to the surface acoustic wave filter according to Cited Reference 2 so as to attain the elastic-wave filter according to Claim 3 is also obvious to those skilled in the art.

Accordingly, Claim 3 lacks an inventive step in view of Cited References 1 and 4, and also lacks an inventive step in view of Cited References 2 to 4.

Claim 4

An elastic-wave filter whose center frequency of a passband is set at 500 MHz or more is commonly known.

Accordingly, Claim 4 lacks novelty and an inventive step in view of Cited Reference 1, and also lacks an inventive step in view of Cited References 2 to 3.

Claim 6

The invention according to Claim 6 is not discussed in any of the documents cited in the international search report and is unobvious to those skilled in the art.

Claim 7

A communication device equipped with an elastic-wave filter is commonly known.

Accordingly, Claim 7 lacks novelty and an inventive step in view of Cited Reference 1, and also lacks an inventive step in view of Cited References 2 to 3.